

What is Claimed is:

1 1. A method of detecting a transmission code from a received signal, the
2 transmission code being composed of a plurality of dithered codes, comprising:
3 detecting the plurality of dithered codes; and
4 detecting the long code based on detected dithered codes.

1 2. The method of claim 1, further comprising:
2 generating a detection signal for each detected dithered code; and
3 combining the detection signals, and detecting the long code based on the
4 combination of detection signals.

1 3. The method of claim 2, wherein the detecting of the plurality of dithered codes
2 is performed by correlating the received signal with a plurality of reference codes thereby
3 generating a plurality of correlation sums, each of the references codes formed by
4 delaying a reference code by a predetermined amount.

1 4. The method of claim 3, wherein the transmission code is composed of M
2 dithered codes, where M is an integer, and M correlation sums are generated when
3 performing the correlation, and the combining is performed by summing the M
4 correlation sums to generate a present final sum, and the detecting of the long code is
5 performed by determining a largest final sum from among the present final sum and a
6 plurality of previously generated final sums and associating a time of the largest final sum
7 with the time of the transmission code.

1 5. The method of claim 1, wherein the dithered codes are dithered according to
2 a stationary dither pattern.

1 6. A dither code detector receiving a coded signal having a long code composed
2 of a plurality of dithered codes wherein the dithered codes are dithered according to a
3 dither pattern, the detector comprising:
4 a correlator unit correlating the coded signal with a reference code and outputting

5 a correlation signal;

6 a detector combining portions of the correlation signal according to the dither
7 pattern and detecting the long code based on the combined portions of the correlation
8 signal.

1 7. The dither code detector according to claim 6, further comprising a processing
2 unit coupled to the detector and processing the detected long code to determine timing
3 information from the received coded signal.

1 8. The dither code detector according to claim 6, wherein the detector comprises:
2 a delay unit receiving the correlation signal and delaying it according to the dither
3 pattern and outputting delayed correlation signals; and
4 a combiner receiving the correlation signal and combining it with the delayed
5 correlation signals and outputting a combined correlation signal.

1 9. The dither code detector according to claim 8, wherein the delay unit
2 comprises:

3 a first counter counting with a first modulus corresponding to a dither of at least
4 a first one of the dithered codes;

5 a first memory storing a portion of the correlation signal at a location according
6 to a count of the first counter and outputting the portion of the correlation signal when
7 the first counter next addresses the location according to the first modulus; and

8 wherein the combiner comprises an first adder adding the delayed portion of the
9 correlation signal with a current portion of the correlation signal and thereby generating
10 a first combined correlation signal.

1 10. The dither code detector according to claim 9, wherein the delay unit further
2 comprises:

3 a second counter counting with a modulus corresponding to a dither of at least a
4 second one of the dithered codes;

5 a second memory storing a combined correlation signal at a location according

6 to the second counter and outputting the combined correlation signal when the second
7 counter next addresses the location according to the second counter modulus; and
8 wherein the combiner further comprises a second adder adding the delayed
9 combined signal with a current portion of the correlation signal and thereby generating
10 a second combined correlation signal.

1 11. The dither code detector according to claim 10, wherein the detector further
2 comprises a maximum finder unit for arranging outputs of the second adder according to
3 the strength of the second combined correlation signal, and if the second combined
4 correlation signal is the largest signal among the signals arranged by the maximum finder,
5 detecting a phase of the long code based on the second combined correlation signal.

1 12. The dither code detector of claim 6, wherein the dither pattern is a stationary
2 dither pattern.

1 13. A maximum finding unit, comprising:
2 a first storage unit receiving and storing a value of a first signal;
3 a second storage unit receiving and storing a value of a second signal;
4 a comparator comparing a value stored in the first storage unit with a current
5 signal value and generating a control signal according to the comparison;
6 a multiplexer connected to the first and second storage units and the comparator,
7 for arranging the first and second signals in response to the control signal, wherein if the
8 current signal value is greater than the value of the second signal and less than the value
9 of the first signal, then the value of the second signal is moved to a third storage unit and
10 the value of the current signal is stored in the second storage unit.

1 14. The maximum finder unit according to claim 13, wherein the values of the
2 first and second signals are sums of correlation signals formed over a period of a code
3 composed from dithered short codes.

1 15. The maximum finder unit according to claim 14, wherein the dithered short
2 codes are dithered according to a stationary dither pattern.

1 16. A method for detecting a code composed of codes dithered according to a
2 dither pattern, the method comprising:

3 a) correlating a received signal and a plurality of reference codes thereby
4 generating a plurality of correlation signals;

5 b) combining the plurality of correlation signals based on the dither pattern and
6 producing a final combined correlation signal;

7 c) detecting the composite code based on the final combined correlation signal.

1 17. The method according to claim 16, further comprising:

2 d) generating a plurality of combined correlation signals; and

3 e) arranging the plurality of combined correlation signals in order of the strength
4 of the combined correlation signals.

1 18. The method according to claim 16, wherein the combining the plurality of
2 correlation signals includes:

3 b1) delaying a first one of the plurality of correlation signals by an amount equal
4 to the period of a first one of the dithered codes;

5 b2) adding the delayed correlation signal to a current correlation signal to produce
6 a combined correlation signal;

7 b3) delaying the combined correlation signal by an amount equal to the period of
8 another one of the dithered codes;

9 b4) adding the combined correlation signal delayed in b3) to a current correlation
10 signal to produce a new combined correlation signal;

11 b5) repeating b3) and b4) using delays based on the dither pattern and using the
12 new combined correlation signal in place of the combined correlation signal produced in
13 b2), until the adding of b4) is performed a number of times equal to the number of
14 dithered codes present in the composite code, and then outputting the new combined
15 correlation signal as the final combined correlation signal.

19. The method according to claim 18, wherein the delaying of b3) is performed by storing the combined correlation signal in a memory at an address computed modulo N, where N corresponds to the period of said another one of the dithered codes.

20. The method according to claim 16, wherein the detecting the composite code includes:

c1) comparing the final combined correlation signal with previously generated final combined correlation signals;

c2) selecting, based on the comparison of c1), the combined correlation signal having the strongest correlation value; and.

c3) detecting the composite code by determining the phase of the long code based on a receive time of the selected combined correlation signal.

21. The method according to claim 16, wherein the dither pattern is a stationary dither pattern.